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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/559,409	12/05/2005	Wouter Van Der Wijngaart	072187-079640	7177
26288	7590	10/06/2009	EXAMINER	
ALBIHNS AB			PRICE, CRAIG JAMES	
BOX 5581				
Valhallavagen 117			ART UNIT	PAPER NUMBER
STOCKHOLM, SE-114 85			3753	
SWEDEN			MAIL DATE	DELIVERY MODE
			10/06/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/559,409	Applicant(s) VAN DER WIJNGAART ET AL.	
	Examiner Craig Price	Art Unit 3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,6-14 and 24-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6-14 and 24-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 December 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 1, 3, 4, 6-14, 24-26 are pending. Claims 2, 5, 12, 15-23 are cancelled.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "210" has been used to designate both obstruction element and layer, correction to Figure 4c is required.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 9 is objected to because of the following informalities: In claim 9, "microvalves are actuated" should be - -microvalve is actuated - -. Appropriate correction is required.

The claims are objected to because the lines are crowded too closely together, making reading difficult. Substitute claims with lines one and one-half or double spaced on good quality paper are required. See 37 CFR 1.52(b).

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Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 10 and 11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 10, lines 2 and 3, the limitation “the obstruction element is displaced to obstruct the flow in a frictionless “free-hanging” manner” is not described in the specification using full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same. The specification on page 8, lines 1-8 describe the movement of the obstruction element moving in a plane perpendicular to the flow but does not describe the means to perform this movement. Claim 1 recites an actuator, but it is unclear as to how the actuator displaces the obstruction in a frictionless manner.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,3,6,10,13,14, 24 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Kluge et al. (6,131,879).

Kluge et al. disclose a microvalve (Figures 2A,B) for providing flow regulation suitable for use in a microsystem comprising, a first substrate layer 34 defining a first plane, a second layer 12,20 disposed over the first substrate layer cooperating with the first substrate layer to form a flow duct through which the flow traverses thereby defining a direction of main flow along a flow axis, an obstruction element 14 introducible in the flow duct defined by the second layer for obstructing the flow, the obstruction element being displaceable in a second plane substantially perpendicular to the direction of main flow and out of plane with respect to the first substrate layer, and actuator means 10 operative on the obstruction element for controllably displacing the obstruction element to regulate the flow.

Regarding claim 3, Kluge et al. disclose that the external actuator means is attached to the obstruction element operative for controllably displacing the obstruction element to regulate the flow (Col. 4, Lns. 58-59).

Regarding claim 6, Kluge et al. disclose that the microvalve is actuated using piezoelectric actuation means (Col.4, Ln.54).

Regarding claim 10, Kluge et al. disclose that the obstruction element is displaced to obstruct the flow in a frictionless "free-hanging" manner in order to avoid tribological effects during operation (as shown 14 moves essentially without friction).

Regarding claim 11, Kluge et al. disclose that the "free-hanging" obstruction element, when in a closed position, is laterally moved a small distance in a direction

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substantially parallel to the direction of the flow against a jam formed from the second layer to reduce or block off any leakage flow (as shown in Figures 2A and 2B the element 14 moves parallel to flow and “against a jam” in as much the same manner as does applicant's device).

Regarding claims 13 and 14, Kluge et al. disclose that the second layer mainly comprises silicon material (Col.4, Lns. 62-64). “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985), see MPEP 2113.

Regarding method claims 24 and 25, the device shown by Kluge et al. will perform the methods as recited in claims 24 and 25, during normal operational use of the device.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kluge et al. '879 in view Jerman ("Electrically-Activated, Micromachined Diaphragm Valves," Hal Jerman, Technical Digest IEEE, Sensor and Actuator Workshop, Jun. 1990, pp. 65-69.).

Kluge et al. is silent to having an actuator means is a thermal bimorph actuator comprising materials with different thermal expansion coefficients such as aluminum bonded together with the material from the second layer, wherein a controllable temperature change causes the bimorph actuator to bend due to the difference in thermal coefficients of expansion between the materials.

Jerman discloses a microvalve which teaches the use an aluminum layered thermal responsive actuator (page 66, Para.1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute a thermal actuator as taught by Jerman to close the valve (Col.1, Lns. 59-61).

Regarding method claim 26, the device shown by Kluge et al. in combination with Jerman will perform the methods as recited in claim 26, during normal operational use of the device.

Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kluge et al. '879.

Official Notice is hereby taken that it is widely known in the microvalve fluid handling art to use magnetic, electrostatic, and thermal actuation means such as monomorph expansion, shape memory, or thermopneumatic means situated as actuation devices, to deflect or move the valve member to restrict or close a valve opening.

Claim 14 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kluge et al. '879 in view of Williams et al. (6,523,560).

Kluge et al. discloses that the layer is formed by "conventional techniques" (Col.4, Lns. 61-64) however is silent to having the microvalve structures being microfabricated using Deep Reactive Ion Etching (DRIE).

Williams et al. disclose a microvalve which teaches the use of the DRIE process (Col. 9, Lns. 43-45).

It would have been to one of ordinary skill in the art to select the process using DRIE as taught by Williams et al. into the device of Kluge et al. in order to form a "freed" actuator in the middle of the wafer.

Response to Arguments

Applicant's arguments filed 6/10/2009 have been fully considered but they are not persuasive. The argument that Kluge does not show "a microvalve comprising a first

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layer defining a first plane and a second layer disposed over the first substrate layer cooperating with the first substrate layer to form a flow duct through which the flow traverses thereby defining a main flow along a flow axis” is not persuasive. Kluge has a first layer 34 and a second layer 12 disposed over the first layer, this area forms the main flow duct, which then defines a flow axis. Applicant’s argument that the “Kluge patent discloses a flow duct which has no single main direction of flow” is not persuasive as there is no positive recitation requiring a “single main direction of flow”.

Applicant’s argument that “the Kluge patent does not show an obstruction element for obstructing the flow, said obstruction element being displaceable in a second plane substantially perpendicular to the flow axis and out of plane with respect to the first substrate layer” is not persuasive. The obstruction element 14 of Kluge has a distal end near 30, this end is on a second plane with respect to the plane of the first layer 34. The obstruction element 14 moves perpendicular to the flow axis which is between the two layers 12 and 34.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig Price whose telephone number is (571)272-2712. The examiner can normally be reached on 7AM - 5:30PM Mon-Thurs, Increased flex time.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on (571) 272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CP

30 September 2009

/John Rivell/

Primary Examiner, Art Unit 3753

/C. P./Examiner, Art Unit 3753